

SPECIFICATION

TITLE

"FRAMELESS CABINET DOOR SYSTEM AND METHOD"

BACKGROUND OF THE INVENTION

It is known to provide a steel shelving unit having a plurality of adjustable shelves, such as shown in U.S. Patent No. 6,105,513. It is also known to provide a cabinet with steel shelving having a back panel, two side panels, and two door panels mounted on a rigid welded frame. The frame, with the door panels attached to the frame, may be used to retrofit to an existing steel cabinet by mounting the frame with the doors onto the front of the cabinet. With such a prior art system, however, the frame with the attached door panels is shipped to a customer as a large bulky unit. Furthermore, hinges are visible at sides of the frame where the door panels are attached to the frame. Also, the frame must be accurately aligned and welded, and a substantial number of components are required for manufacturing the frame with the attached door panels.

When welding the frame, there is the disadvantage that it is difficult to keep the frame square and true during manufacture.

SUMMARY OF THE INVENTION

It is an object of the invention to simplify a door system installed on a cabinet, to reduce manufacturing cost and complexity thereof, and to minimize the number of components employed.

In accordance with the invention, a method and system is provided by which door panels are installed on the cabinet. A bottom support and a top support are

installed to corner posts in the cabinet. A bottom door jamb is installed on the bottom support. Pivot pins are provided at a top and bottom of each of the right and left door panels. With the door panels upright, the respective bottom pivot pins are inserted in respective apertures of the bottom door jamb. An upper door jamb is positioned such that apertures of the upper door jamb are received over the respective top pivot pins of the right and left door panels. The upper door jamb is then attached to the top support.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective front view of a frameless cabinet door system with the door panels closed;

Fig. 2 is a front perspective view of the cabinet door system of Fig. 1, but with the door panels open;

Fig. 3A is an end view of an extender which is optionally employed when mounting the door panels on the cabinet;

Fig. 3B is a fragmentary perspective view showing the extender mounted on the front of the cabinet by an extender clamp;

Fig. 3C is a perspective end view of the extender clamp used to mount the extender;

Fig. 4A is an end view of top and bottom shelf supports;

Fig. 4B is a front fragmentary perspective view of the top and bottom shelf supports prior to attachment;

Fig. 5A is an end view of the bottom jamb for the door system;

Fig. 5B is a plan view of the bottom door jamb;

Fig. 5C is a fragmentary perspective view showing the bottom door jamb installed at the bottom of the cabinet and with the right side door panel attached;

Fig. 6A is a bottom view of the right side door panel with a bottom pivot pin plate attached;

Fig. 6B is a fragmentary perspective view of the bottom of the right side door panel of Fig. 6A with the bottom pivot pin plate attached together with a bushing;

Fig. 7A is an end view of the cabinet top door jamb;

Fig. 7B is a plan view of the cabinet top door jamb; and

Fig. 7C is a fragmentary perspective view showing the top door jamb installed together with the right side door panel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the preferred embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and/or method, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur now or in the future to one skilled in the art to which the invention relates.

The storage cabinet 10 having the frameless cabinet door system is shown in front perspective in Fig. 1 with the doors closed. As shown in Fig. 2 with the doors open, the cabinet has four L-shaped cross-section corner posts 6, 7, 8, and 9 supporting shelves, a top panel 11, a left side panel 12, and a right side panel 13. The back and front corner posts are L-shaped and folded to create a double-walled first and second flanges such as 9A, 9B with the first flange 9A double-walled construction having a greater gap since one of the walls has slots therein for receiving pins with

locking buttons as described hereafter. A right door panel 14 and a left door panel 15 are shown in the closed configuration. A lock handle 16 for opening and closing the door panels is provided.

A top door jamb 17 and a bottom door jamb 18 are positioned above and below the door panels. Significantly, no side hinges are visible, providing an overall advantageous "clean" look.

In Fig. 2, the right and left door panels 14 and 15 are swung open and the interior of the cabinet 10 is illustrated from the front. The cabinet 10 has a plurality of adjustable shelves 19, and a bottom shelf 20, supported by shelf supports not visible in Fig. 2.

If necessary, to provide clearance for files at the front of the cabinet, an optional right extender 21 and an optional left extender 22 are provided, as described in more detail hereafter. These extenders are fastened to the front of the cabinet at respective corner posts 9, 8 by a plurality of extender clamps 23 described hereafter. Also, a lock assembly 24 is generally shown attached to the right hand door panel 14 and is activated by the lock handle 16 as shown in Fig. 1.

Fig. 3A shows an end view of the right side extender 21 having an inside lip 25, a front surface 26, an outer side surface 27, and a back clamping surface 28.

As shown in the perspective view of Fig. 3B, extender clamp 23 shown in perspective cross-section in Fig. 3C mounts the extender 21 to a flange 9A of L-shaped corner post 9 at the front of the cabinet. A similar extender 22 at the left side is mounted to corner post 8. The extender clamp has clamping side surfaces 23A, 23C and a junction surface 23B. The set screw 23D may also be provided to tighten the attachment of the extender to the cabinet corner post flanges 9A.

To support the top and bottom door jambs and also the bottom shelf, as shown in Fig. 4B identical bottom and top shelf supports 29 and 30 are provided. As shown in the end view of Fig. 4A, the shelf support 29 has a vertical section 31 with a top edge 31A, a horizontal intermediate surface 32, and a front surface 33 with first and second protruding locking pins having locking buttons 34A, 35A at each end of the shelf support mounted on a support tab 100 projecting from the outer ends of the shelf support.

The locking pins 34 and 35 with respective locking buttons 34A, 35A are received in locking apertures 101 extending vertically along a back wall of a double-wall second flange 9B of L-shaped corner flange 9. As shown in Fig. 4B, the L-shaped corner post 9 has a doubled wall first flange 9A and the doubled wall second flange 9B formed by the steel being folded back on itself. The flange 9A has a greater spacing between its doubled walls to allow for sufficient room for receiving the locking buttons 34A and 35A in the space between the doubled walls. The flange 9B has a smaller spacing and receives the edge of the cabinet side 13. The same type of shelf supports like supports 29 and 30, of course, may also be employed for supporting the intermediate shelves 19.

The bottom door jamb 35 is shown in an end view and a plan view in respective Figures 5A and 5B. The bottom door jamb 35 has a stepped up horizontal raised surface 36 at the top of a step vertical wall 37. Below the raised surface 36 at the base of step wall 37 is a horizontal lower surface 38 terminating at the front of the jamb with an outwardly facing vertical jamb surface 39. A bottom base surface 40 is provided below the lower surface 38.

The raised surface 36 has a plurality of mounting holes 41. The lower surface 38 has door panel pivot holes 43 and 44 in outwardly extending ends 102 and 103 of lower surface 38.

As shown in the perspective view of Fig. 5C, the door 14 is mounted to the jamb 35 after the jamb 35 has been mounted in position just below the bottom shelf 20. A pivot plate 42 at the bottom of the door 14 has a pivot pin 44 carrying a slip over bushing 45 as a weight bearing surface (See also Fig. 6B). The pivot plate 42 is attached by screws 46, 47 at the bottom of the door as shown in Fig. 6B. A similar plate 56 having an associated pivot pin 200, but without any bushing, is provided at the top of the door 14 as shown in Fig. 7C.

As shown in Fig. 6A, as viewed from the bottom, the door panel 14 of Fig. 6B is constructed of reinforcing channels 14A, 14B mounted on a backside of a front surface 14E of the door panel 14. Side walls 14D and 14H are also provided.

The bottom and top of the door 14 have respective end surfaces 14C, 14J. Each of these end surfaces has respective mounting apertures 14F, 14G and 14K, 14I for receiving the respective screws for attaching the pivot pin mounting plates 42 and 56 previously described.

The bottom and top pivot pins 44 and 200 have their longitudinal center line aligned in a plane of the front surface 14E of the door panel 14. Thus half of each pin sticks out beyond the front of the door so that the door 14 (and similarly door 15) can be opened by 180° when cabinets are side-by-side.

The construction of left door 15 is similar to right door 14 described above and therefore has not been separately described.

Fig. 7A and 7B are respective end and plan views of the top door jamb 50. Top door jamb 50 has a lower horizontal surface 51 with a projection 54 serving as a stop for door panels 14 and 15. The horizontal lower surface 51 also has a plurality of mounting holes 57.

A front jamb surface 52 is positioned at the front edge of lower surface 51 which bends over into a top lip 53.

Door panel pivot holes 55 and 56 receive respective pivot pins on the door panels.

As shown in the fragmentary perspective view of Fig. 7C, the top door jamb 50 is placed on the top pivot pins of the respective door panels and then the top door jamb 50 is mounted in place to the top shelf support previously described.

With the door system and method described in the preferred embodiment, there is a modern appearance with no frame or hinges on the sides. Elimination of the frame provides a greater height opening for storage access. Also, file access to the top shelf is not obstructed.

A welding fixture is not needed, making manufacture of more sizes feasible.

The bottom jamb replaces a traditional base for anchoring.

A smaller shipping package is possible to help reduce shipping damage.

The optional extension unit is available to provide clearance for the front of the files which extend beyond the shelves.

By eliminating the welded frame, there is the advantage of manufacturing simplicity. To the contrary, when welding a frame, it is difficult to keep the frame square and true, and thus difficult to maintain accuracy.

Many of the parts of the door system described can be sheared and punched with simplicity.

When mounting the various components, bolting in the field results in no distortions to the overall system. Moreover, a minimal number of relatively smaller parts are shipped and damage can be prevented.

The assembly method for the door system is simple and straight forward, and generally follows the previously described drawing Figures. Of course, changes in the sequence of assembly steps is also possible.

While a preferred embodiment has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention both now or in the future are desired to be protected.